UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
File Log No. 8639

October 5, 2000

Mr. James Sheetz, P.E., DEE
Water Quality Source Control Section
Northwest Region
Oregon Department of Environmental Quality
2020 SW Fourth Avenue, Suite 400
Portland, Oregon 97201

Re: Comments on public notice draft waste discharge permit for Blue Heron Paper Company

Dear Mr. Sheetz:

The National Marine Fisheries Service (NMFS) is responsible for the management, conservation, and protection of living marine resources within the United States Exclusive Economic Zone. The NMFS also supports and advises states on the management of living marine resources in areas under state jurisdiction. Under the Endangered Species Act (ESA), NOAA Fisheries, as delegated by the Secretary of Commerce, is responsible for the protection of marine and anadromous species listed as threatened or endangered. The ESA allows NMFS to cooperate with states to implement conservation and recovery actions for listed species. Working under these authorities and agreements, NMFS has reviewed the draft National Pollutant Discharge Elimination System waste discharge permit and permit evaluation review for the Blue Heron Paper Company.

Since the public hearing was held on this permit, we have had three productive meetings with Department of Environmental Quality (DEQ) staff (August 22 and 25, and September 28, 2000). The NMFS appreciates the willingness of DEQ staff to explain and attempt to resolve permit issues related to the conservation of anadromous fish. We acknowledge and support the efforts of the Blue Heron Paper Company and the Department of Environmental Quality (DEQ) to modify current discharges and thereby reduce adverse effects on fishery resources in the Willamette River. Also, Blue Heron's use of recycled paper for part of its raw materials and it avoidance of chlorinated bleaching processes offer significant environmental benefits relative to other methods of paper production. However, the plant's discharges as proposed are likely to adversely affect ESA-listed anadromous fish, so NMFS has included an analysis of key permit issues and recommendations to reduce adverse effects. This letter includes recommendations for the DEQ, and for efficiency's sake, also includes recommendations for the Blue Heron Paper Company.

Key Permit Issues

Based on the previous discussions and our review of the subject documents, we have identified the following key issues to address in our comments:

1. What are the temporal and spatial distribution patterns of ESA-listed anadromous fish in the area of the river affected by the discharge?

2. Has the mixing zone been located so as to minimize exposure to listed anadromous fish?

3. How would listed anadromous fish be affected by effluents in the mixing zone?

4. What are the effects of the heat load, turbidity, biological oxygen demand, and toxins added by the discharge to the listed anadromous fish in the river beyond the mixing zone?

5. What are the effects of water intake on juvenile anadromous fish?

I. What are the temporal and spatial distribution patterns of listed anadromous fish in the area of the river affected by the discharge?

The Willamette River supports two species listed by the National Marine Fisheries Service (NMFS) as threatened under the Federal Endangered Species Act (ESA). Upper Willamette River (UWR) chinook salmon (*Oncorhynchus tshawytscha*) were listed as threatened under the ESA on May 24, 1999. Upper Willamette River (UWR) steelhead (*Oncorhynchus mykiss*) were listed as threatened under the ESA on March 25, 1999. Critical habitat for both of these species was designated on February 16, 2000 (effective on March 17, 2000) (65 FR 7764), and includes all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years).

The NMFS has issued a final rule under section 4(d) of the ESA (65 FR 42422) that will prohibit the taking[1] of UWR steelhead (effective September 8, 2000) and UWR chinook (effective January 8, 2001). After the rule becomes effective, the incidental take of UWR steelhead or UWR chinook for otherwise

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[1]Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which would include, but are not limited to breeding, feeding, and sheltering.

lawful activities can be authorized only through an incidental take permit under the ESA section 7 (pertaining to Federal activities) or section 10 (pertaining to non-Federal activities).

The NMFS disagrees with the conclusions in the permit evaluation review report (PER) with respect to the lateral distribution of juvenile salmonids within the Willamette River. Citing Ward et al. (1994), Appendix O in the PER states that juvenile salmonids in the Willamette River "could be found anywhere but typically were found within 150 feet of the shore and most were collected within 18 feet of the water surface..." Apparently based on this information, the draft permit establishes a mixing zone just outside of this shoreward zone to "avoid impact to aquatic life."

Radio telemetry studies described in Ward et al. (1994) actually found somewhat greater densities of juvenile chinook and steelhead in offshore sample grids than inshore sample grids. Ward et al (1994) state that "we did not detect any spatial pattern in the downstream migration of radio-tagged yearling chinook salmon or juvenile steelhead." In the Hanford Reach of the Columbia River, outmigrating yearling spring chinook and steelhead were found mainly in the bottom, midchannel zone of the river (Dauble et al. 1989). Radio tracking in the Lower Granite Reservoir on the Snake River found juvenile spring chinook had a mean distance from shore of 121 m, and juvenile steelhead had a mean distance from shore of 210 m (Adams et al. 1995). In the upper Columbia River estuary (Jones Beach), Dawley et al. (1986) collected substantially higher numbers of spring chinook and steelhead per set in offshore purse seines than in beach seines.

With respect to the vertical distribution of juvenile salmonids within the Willamette River, vertical gill net studies described in Ward et al. (1994) show that a majority of fish were collected within 6 m (approximately 18 feet) of the surface, but the results should be applied to the entire river, as the method was used only near the shore to avoid main-channel shipping traffic (David Ward, ODFW, pers. comm. with Jeff Lockwod, NMFS).

II. Has the mixing zone been sized and located so as to minimize exposure to listed anadromous fish?

Based on the information described under issue number (1) above, all areas of the Willamette River in the vicinity of the discharge are used by juvenile UWR chinook and steelhead.
There is no compelling information about the lateral distribution of juvenile UWR chinook and juvenile UWR steelhead that would favor any particular location for the discharge with respect to distance from the shoreline. As for as the vertical placement of the discharge, there is relatively inconclusive information suggesting that there would be no discernible benefit, and possibly some additional adverse effects, should the discharge be moved to the mid- or upper-levels of the water column. Based on currently available information, there is no location for the mixing zone that would avoid adverse effects to listed anadromous fish.

Recommendation: Because there is no location for the mixing zone that would avoid adverse effects to listed anadromous fish, the DEQ should minimize the size of the mixing zone to the extent practicable.

III. How would listed anadromous fish be affected by effluents in the mixing zone?

The effluent from the Blue Heron plant discharged at Outfall 001 has a daily maximum temperature of 34.5° C, and the company has requested this as the effluent temperature limit for the draft permit. Under provisions of the temperature management plan included by DEQ in the draft permit, the 7-day average maximum of the effluent temperature would be 33.6° C at the end of the first year. At this effluent temperature, the discharge will result in more than a 0.14° C temperature increase at the edge of the mixing zone when the river is at the temperature standard of 20° C (the river currently exceeds the standard during the summer). At the end of the second year, the 7-day average maximum effluent temperature would be approximately 30° C. At this effluent temperature, the discharge will result in less than a 0.14° C temperature increase at the edge of the mixing zone when the river is at the temperature standard of 20° C. This would not be a measurable change in temperature due to the effluent (although the effluent would still be adding heat to the river; see discussion under (4) below). The seven-day averaging of temperatures means that the discharge could exceed the temperatures given above at certain times.

During the period of April 1 to May 31, DEQ is requiring that a threatened and endangered species criterion of 17° C be met at the edge of the mixing zone. This criterion, selected to reduce the disease effects that are prevalent at warmer temperatures, would require the effluent temperature to be reduced to 29.7° C during this period. The NMFS supports the DEQ in setting this criterion for threatened and endangered species; however, the period in which this criterion is applied may need to be extended (see discussion of migration timing under (4) below). Also, it is not clear whether this would be a daily limit or a 7-day average maximum temperature.

A Zone of Initial Dilution (ZID) is a part of a mixing zone where acute water quality criteria may be exceeded under the Clean Water Act. The acute criterion is the concentration that would be lethal to aquatic organisms that would be exposed for less than an hour. The ZID for the Blue Heron discharge is 6.8 m from the point of discharge. Based on modeling information presented in the August 22, 2000, meeting, most of the effluent dilution is predicted to occur within 0.2 seconds of discharge, within 1 m of the diffusers. Under summer conditions (ambient temperature assumed 24° C), water that is approximately 34° C at the point of discharge is predicted to drop to less than 25° C within this time and distance. Under spring conditions (ambient temperature assumed 17° C), water that is approximately 31° C at the point of discharge is predicted to drop to less than 18° C within this time and distance.

The upper incipient lethal temperature (UILT) is an exposure temperature, given a previous acclimation to a constant acclimation temperature, that 50% of the fish can tolerate for 7 days (Elliott 1981). For acclimation temperatures in the range of 16 to 24° C, the UILT for chinook salmon is approximately 25° C, and for rainbow trout is approximately 26° C (McCullough 1999). Adult salmonids appear to have lethal tolerances 2-3° C lower than the juvenile fish typically used in lethality testing. The National Academy of Science (1972, as cited in McCullough 1999) recommended that a safety factor of -2° C be added to the UILT. This safety factor was meant to minimize mortality but did not consider disease incidence or other sublethal effects, which were poorly understood at that time (McCullough 1999). The UILT also does not consider other stressors that may be present, such as high turbidity or low dissolved oxygen, that may cause the fish to die at temperatures lower than the UILT (McCullough 1999).

The incipient lethal temperature (ILT) for a given fish species is determined by acclimating the fish to one temperature and then subjecting them instantaneously to another temperature. For spring chinook salmon acclimated at 15° C and subjected to water at 29.7° C, survival time can be calculated to be 3.2 minutes (McCullough 1999).

Acute thermal shock leading to death can be induced by rapid shifts in temperature (McCullough 1999). The effect of the shock depends on acclimation temperature, the magnitude of the temperature shift, and exposure time (Tang et al. 1987, as cited in McCullough 1999). Thermal shock can also indirectly increase mortality. Juvenile chinook salmon and rainbow trout acclimated to 15 to 16° C and transferred to temperature baths in the range of 26 to 30° C (cooler than temperature of the Blue Heron discharge) suffered significantly greater predation than controls (Coutant 1973). Coho salmon and steelhead trout acclimated to 10° C and transferred to 20° C water suffered physiological changes including hyperglycemia, hypocholestorolemia, increased blood hemoglobin, and decreased blood sugar regulatory precision (Wedemeyer 1973).

The NMFS is particularly concerned about juvenile UWR chinook and UWR steelhead that are not strong swimmers, and may be swept into the ZID by the current. Juvenile fish entering the ZID in the mixing zone, particularly within 1 m of the point of discharge, may be subject to sublethal and potentially lethal thermal shock effects as described above.

Recommendation: Blue Heron Paper Company should consider applying for a section 10 incidental take permit for its discharges to the Willamette River because of the potential for lethal thermal shock effects to listed UWR chinook and UWR's steelhead.

IV. What are the effects of the heat load, turbidity, biological oxygen demand, acid/base balances, and toxic pollutants added by the discharge to the river beyond the mixing zone?

Heat Load

The Willamette River does not meet the current water quality standard of 20° C. This standard was disapproved by the Environmental Protection Agency (EPA), but the EPA has not promulgated a replacement standard. The permit evaluation report acknowledges that since the river is water quality limited for temperature, every source of excess heat to the river is significant, and all sources need to be reduced or eliminated in order to reverse the warming trend.

The NMFS acknowledges the efforts being made by the DEQ and Blue Heron Paper Company to reduce discharge temperature. These efforts are being conducted prior to development of the Total Maximum Daily Load (TMDL) for the river, which will consider all contributors of heat in addressing elevated temperatures in the river. The draft permit would require heat load reductions to achieve the following 7-day average maximum effluent temperatures: 34.5° C upon permit issuance; 33.6° C within 12 months of permit issuance; and 30.0° C within 30 months of permit issuance, unless a higher temperature is demonstrated to cause no measurable increase at the edge of the mixing zone.

The proposed reductions in heat load will not be adequate to reverse the warming trend, and the plant will continue to contribute to existing temperature problems in the river. Also, an analysis by the Northwest Environmental Defense Center (NEDC) that was submitted to DEQ points out that the effluent temperature of 35.5° C used to calculate Blue Heron's current heat load is significantly warmer than Blue Heron's typical discharges. Daily monitoring reports submitted to DEQ show that 35.5° C was met or exceeded on only five days between 1995 and 1999 in the previous five years, according to the NEDC analysis. While evaluating the plant’s maximum temperatures is appropriate for assessing the most significant effect the discharges may have, it is not a suitable method for ensuring that temperatures of more typical discharges also are reduced.

Preferred temperatures for adult migration are 3.3° C-13.3° C for spring chinook salmon (Beschta et al. 1987, Bell 1991, Bjornn and Reiser 1991, Spence et al. 1996). Migration blocks can occur at temperatures of 21° C (DEQ 1995, McCullough 1999). The Independent Scientific Group (1996) cites 10° C as the optimum temperature for chinook migration with a range of 8.0°C-13.0° C; stressful conditions at temperatures greater than 15.6°C; and a lethal temperature of 21° C.

As spring chinook salmon spend several months in freshwater prior to spawning (Myers et al. 1998), water temperature during this period is critical to successful reproduction. DEQ (1995) cites temperatures of 8.0-12.5° C as required for adult spring chinook salmon holding. Increased mortality of adult spring chinook holding in freshwater has been cited to occur above 13.0-15.5° C (DEQ 1995, McCullough 1999), greater than or equal to 17.5° C (Berman 1990), and 18-21° C (Marine 1992). Disease virulence and the risk of adult mortality increase rapidly above 15.5-16.7° C in chinook, sockeye, and coho salmon (DEQ 1995, McCullough 1999).

Reproductively-mature spring chinook salmon held at temperatures between 17.5 and 19° C had more pre-hatch mortalities and developmental abnormalities, as well as smaller eggs and alevins, than adults held at temperatures between 14.0 and 15.5° C (Berman 1990). Other studies reviewed by McCullough (1999) also indicate poor survival of eggs from adult chinook held above 14.0°C. Pre-spawning survival and maturation are optimized at 6.0-14.0° C according to Marine (1992). Adult sockeye salmon held at preferred temperatures lost less of their body weight and maintained visible fat reserves while those held at elevated temperatures lost greater quantities of body weight and visible fat reserves were essentially depleted (Bouck et al. 1977). By depleting essential energy reserves, elevated temperatures during migration or holding periods could reduce reproductive success.

Spring chinook require temperatures of 3.3-12.2° C for smoltification and outmigration (DEQ 1995). DEQ (1995) states "It is recommended for all salmonids that temperature not exceed 54° F (12.2° C) to maintain the migratory response and seawater adaptation in juveniles..." If spring temperatures are too high, salmon smolts will revert to a pre-smolt physiology and remain in fresh water (Spence et al. 1996, McCullough 1999).

Some authors have reported that UWR chinook salmon adults migrate upstream past Willamette Falls from May to early June (Myers et al. 1998, Mamoyac et al. 2000). However, Shreck et al. (1994) and Oregon Department of Wildlife (ODFW) unpublished fish passage data for 2000 indicate substantial adult migration continuing past Willamette Falls into or through late June, with a small number of adults continuing to migrate in decreasing numbers through July. Most juveniles migrate downstream as sub-yearling fish from March to early June, with a peak in mid-May (Ward et al. 1994, Mamoyac et al. 2000). A second group of juveniles migrate downstream as yearlings from mid-September to early December (Mamoyac et al. 2000). These larger fish may be more likely to survive the estuarine and oceanic phases. A few juveniles migrate downstream during January, February, and August (Mamoyac et al. 2000).

UWR steelhead migrate upstream past Willamette Falls from November through May, with the bulk of the run migrating from March to May (Howell et al. 1995, Busby et al. 1996, Mamoyac et al. 2000). Peak passage at Willamette Falls was in April from 1957 to 1966, and has usually been from February to March since 1970 (Howell et al. 1985). Steelhead juveniles migrate downstream past Willamette Falls from mid-April to early June (Ward et al. 1994, Mamoyac et al. 2000). Spawning habitat for both listed species occurs well upstream of the discharge. Most UWR chinook and UWR steelhead migrate past the Willamette Falls area outside of the months of July and August, when maximum water temperatures occur. However, UWR adult chinook migrate upstream past the Blue Heron plant throughout June, and juveniles migrate downstream during early June, and in the fall beginning in mid-September, when water temperatures often are above the 17° C disease threshold identified by DEQ (Appendix J, PER). UWR steelhead juveniles are also found in the project vicinity.

Based on the information described above, mortality of UWR chinook and UWR steelhead from excessive temperatures in the Willamette River could be occurring during June and the second half of September due to: (1) Reduced disease resistance, increased disease virulence, and increased disease incidence for UWR chinook adults and juveniles of both species; (2) increased pre-hatch mortalities and developmental abnormalities, as well as smaller eggs and alevins, due to sub-optimal incubation temperatures for pre-spawning spring chinook adults; and (3) delay, prevention or reversal of smoltification. Elevated temperatures in the Willamette River may have caused species shifts in the benthic invertebrate community and thereby altered food sources for juvenile salmon and steelhead.

Recommendations:

1. The DEQ should recalculate the plant's heat load to ensure that the proposed heat reductions will occur not just under summer low-flow conditions but throughout the year.

2. The DEQ should add a daily maximum effluent temperature to the permit, as the seven-day average temperature may mask daily temperature spikes that are harmful to anadromous fish.

3. To protect migrating adult UWR chinook salmon, UWR juvenile salmon, and UWR adult steelhead trout, DEQ should extend its threatened and endangered species criterion of 17° C to include the month of June and the fall, beginning in mid-September. The NMFS recognizes that meeting this criterion may require additional reductions in discharge temperature.

4. The DEQ should analyze and consider the effects of the plant's heated effluent on the river's benthic invertebrate community.

Turbidity

The turbidity standard has not been incorporated into this draft permit, although the standard is part of the Oregon water quality standards for protection of beneficial uses, and has been included in some other NPDES permits. The PER states that the turbidity standard was intended to be applied to non-point sources, and is not being applied because: (1) The impact of turbidity on salmonids is believed to be low; (2) only sight-feeding fish, ammocoetes (larval lamprey), and benthic organisms may be affected; and (3) the public has shown little concern about turbidity from point discharges so aesthetics is not an issue. Although effects of turbidity on salmonid behavior and survival varied from positive to negative in different studies, adverse effects have frequently been reported at turbidity levels that would occur in the mixing zone under the draft permit. Also, both juvenile UWR steelhead and juvenile UWR chinook are sight feeders, and likely consume benthic organisms during their migrations. For these reasons, NMFS disagrees with the conclusions of the PER with respect to turbidity.

Recommendation: The DEQ should analyze and consider the effects of turbidity on the benthic invertebrate community, juvenile salmonid feeding, and ammocoete larvae of lampreys.

Biological Oxygen Demand

The draft permit would allow the discharge to reduce dissolved oxygen (DO) in the river from 7.5 mg/L under summer low flow conditions to 7.37 mg/L at the edge of the mixing zone. An additional 0.3 mg/L of DO would be lost due to biological degradation of plant effluents downstream from the mixing zone. The PER is accurate in stating that the DO standard for the Willamette River (6.5 mg/L) is the subject of ongoing discussion between NMFS and DEQ. On the other hand, NMFS did conclude in its ESA consultation with EPA on its approval of the standard that the standard is likely to adversely affect ESA-listed anadromous salmonids. Any reduction in DO below saturation concentration can decrease swimming performance in both adult and juvenile fish, affecting the ability to migrate, forage and avoid predators (DEQ 1995b, Spence et al. 1996). Laboratory studies indicate DO in the range of 6.5-8.0 mg/L can reduce swimming ability of adult and juvenile salmonids by 5-10 percent (DEQ 1995b, Spence et al. 1996). In several species studied, fish growth appeared to be determined by the daily minimum of DO, not the average or maximum. Studies reviewed in DEQ (1995b) indicated possible 5-20% reductions in growth of juvenile coho salmon between 8.0 and 6.5 mg/L DO.

Low DO concentrations increase the acute toxicity of various toxicants such as metals (e.g., zinc) and ammonia (DEQ 1995b). Adverse effects of toxicants may be compounded by low DO. Also, toxicants may increase sensitivity to low concentrations of DO. For example, any toxicant which damages the gill epithelium can decrease the efficiency of oxygen uptake.

Recommendation: The DEQ should change the permit limits for BOD to prevent lowering of dissolved oxygen concentrations at the edge of the mixing zone.

Hydrogen Ion Concentration (pH)

The PER (p. 33) states that the pH standard is applied at the end of the pipe, because the pH at the end of the mixing zone cannot be readily predicted. The PER (page 14) further states that, "effluent limitations must be the most stringent of technology-based and water quality-based parameters, considered parameter by parameter." The technology-based pH range is 5.0 to 9.0, while the water quality-based range is 6.5 to 8.5. The draft permit allows discharges that exceed the water quality-based range at outfalls 001 (a range of 6.0 to 8.5) and 002 (a range of 5.5 to 8.5).

There is little species-specific information for pH effects on anadromous fish. DEQ (1995c) summarized reports by the National Acid Precipitation Assessment Program regarding effects of acidification on aquatic biota. In the pH range of 6.5 to 6.0, species richness of phytoplankton, zooplankton, and benthic invertebrate communities declines slightly due to the loss of a few highly acid-sensitive species, but community abundance or production do not change measurably. Highly acid-sensitive fish species (e.g. fathead minnow and striped bass) may suffer decreased reproductive success. Below pH 6.0, reproductive success of lake trout declines in some waters, and lake and rainbow trout are lost from aquatic habitats at pH 5.5 to 5.0 (DEQ 1995c).

Davidson (1933, as cited in Heard 1991) reported a kill of pink salmon and other fish in an Alaska stream due to carbon dioxide asphyxiation where pH temporarily dropped to 5.6. Vulnerable life stages of chinook salmon are sensitive to pH below 6.5 and possibly at pH greater than 9.0 (DEQ 1995c). Considering the salmonid food base, some insect larvae including those of the mayflies, stoneflies, and caddis flies are sensitive to low pH in the range of 5.5 to 6.0 (DEQ 1995c).

Recommendation: The DEQ should change the permit limits for pH to reflect the water quality-based pH range (6.5-8.5).

Toxic Pollutants

The Willamette River is listed as water-quality limited for biological criteria due to fish skeletal deformities and for toxics due to tissue mercury. The draft permit requires whole effluent toxicity (WET) tests for the effluent from outfall 001. These tests are to be conducted with *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow). The rationale behind using these species is that they are a standard test organisms used in point source discharge monitoring, are easily cultured, and provide for comparison. However, fathead minnows are hardy warm-water fish and results obtained with this species may not apply to cold-water salmonid fishes.

The NMFS is concerned about discharges of cadmium, copper, lead, mercury, and zinc in the effluent at concentrations exceeding the chronic, and in some cases the acute, aquatic freshwater criteria. Although monitoring is required in the draft permit for all five metals, limitations only pertain to zinc due to human health concerns. Any toxicity that occurs is intended to be identified by WET testing. However, because the WET tests use a warm-water fish species that is not representative of the most sensitive fish in the Willamette River, chronic toxicity in cold-water salmonid fishes may not be identified. Also, NMFS is concerned about the potential for accumulation of metals in sediments downstream of the mixing zone.

Recommendations:

1) The DEQ should require in the permit that rainbow trout be added to the species used in the WET tests for toxicity. Rainbow trout have been widely used as bioassay test organisms, are readily cultured, and are more closely related to the native species of concern in the river than fathead minnows.

2) The DEQ should require reductions in cadmium, copper, lead, mercury, and zinc loading to the river. The permit should not allow exceedences of acute criteria for freshwater biota within the mixing zone.

V. What are the effects of the plant's water intake on juvenile anadromous fish?

The plant's water intake, consisting of two side-by-side intakes at one location, was not considered in the draft permit. However, following a request from NMFS, the DEQ provided information on the plant's intake on September 28, 2000. The intake capacity is 1.4725 m^3 sec^{-1} (2.7 x the maximum daily discharge limit in the draft permit). The intake is used 24 h day^{-1}, 365 day yr^{-1}. The intake is screened with a U.S. Filter traveling water screen, installed in the early 1970's, that does not meet the fish protection specifications of the Oregon Department of Fish and Wildlife (ODFW). The company has applied to ODFW for a grant to replace the screens so as to meet both ODFW and NMFS requirements (pers. comm., Bruce Martin, Blue Heron Paper Company). The company anticipates that once ODFW makes its decision, it will take about 14 to 15 weeks to obtain the screens, and about 4 weeks to install both of the new screens.

Recommendation: Blue Heron Paper Company should: (1) Ensure that the new screening for its water intakes meet NMFS' screening criteria (Attachment 1), and (2) install the new screens expeditiously so that to the extent practicable, they are in place during the spring migrations of juvenile UWR chinook and UWR steelhead.

<u>Summary of Recommendations for the DEQ</u>

1) Based on currently available information, there is no location for the mixing zone that would avoid adverse effects to listed anadromous fish. Therefore, the DEQ should minimize the size of the mixing zone to the extent practicable.

2) The DEQ should recalculate the plant's heat load to ensure that the proposed heat reductions will occur not just under summer low-flow conditions but throughout the year.

3) The DEQ should add a daily maximum effluent temperature to the permit, as the seven-day average temperature may mask daily temperature spikes that are harmful to anadromous fish.

4) To protect migrating adult UWR chinook salmon, UWR juvenile salmon, and UWR adult steelhead trout, DEQ should extend its threatened and endangered species criterion of 17° C to include the month of June and the fall, beginning in mid-September. The NMFS recognizes that meeting this criterion may require additional reductions in discharge temperature.

5) The DEQ should analyze and consider the effects of the plant's heated effluent on the river's benthic invertebrate community.

6) The DEQ should analyze and consider the effects of turbidity on the benthic invertebrate community, juvenile salmonid feeding, and ammocoete larvae of lampreys.

7) The DEQ should change the permit limits for BOD to prevent lowering of dissolved oxygen concentrations at the edge of the mixing zone.

8) The DEQ should change the permit limits for pH to reflect the water quality-based pH range (6.5-8.5).

9) The DEQ should require in the permit that rainbow trout be added to the species used in the WET tests for toxicity. Rainbow trout have been widely used as bioassay test organisms, are

readily cultured, and are more closely related to the native species of concern in the river than fathead minnows.

10) The DEQ should require reductions in cadmium, copper, lead, mercury, and zinc loading to the river. The permit should not allow exceedences of acute criteria for freshwater biota within the mixing zone.

Summary of Recommendations for the Blue Heron Paper Company

1) Blue Heron Paper Company should: (1) ensure that the new screening for its water intakes meet NMFS' screening criteria (Attachment 1), and (2) install the new screens expeditiously so that to the extent practicable, they are in place during the spring migrations of juvenile UWR chinook and UWR steelhead.

2) Blue Heron Paper Company should consider applying for a section 10 incidental take permit for its discharges to the Willamette River.

Thank you for the opportunity to comment on this draft permit. If you have any questions or comments regarding this letter, please contact Jeff Lockwood, of my staff, at (503) 231-2249.

Sincerely,

Michael Tehan
Chief, Oregon State Branch
Habitat Conservation Division

cc: Madonna Narvaez, U.S. Environmental Protection Agency
Elizabeth Materna, U.S. Fish and Wildlife Service
Bruce Martin, Blue Heron Paper Company

Attachment

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